



SEQUENCE LISTING

<110> BARTOSCH et al.

<120> Infectious pestivirus pseudo-particles containing functional Erns, E1 and E2 glycoproteins

<130> P08199US00/BAS

<140> US 10/791.283

<141> 2004-03-03

<150> EP 03290506.9

<151> 2003-03-03

<160> 26

<170> PatentIn version 3.2

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<212> DNA

<213> Bovine viral diarrhea virus

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Arg Ala Leu Pro Thr Ser Val Val Phe Lys Lys Leu Phe Asp Gly Arg	
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Lys Gln Glu Asp Val Val Glu Met Asn Asp Asn Phe Glu Phe Gly Leu	
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<211> 102
<212> PRT
<213> Bovine viral diarrhea virus

<400> 2

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Lys Asp Ser Lys Thr Lys Pro Pro Asp Ala Thr Ile Val Val Glu Gly
35 40 45

Val Lys Tyr Gln Val Arg Lys Lys Gly Lys Thr Lys Ser Lys Asn Thr
50 55 60

Gln Asp Gly Leu Tyr His Asn Lys Asn Lys Pro Gln Glu Ser Arg Lys
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Lys Leu Glu Lys Ala Leu Leu Ala Trp Ala Ile Ile Ala Ile Val Leu
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Phe Gln Val Thr Met Gly
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<210> 3
<211> 227
<212> PRT
<213> Bovine viral diarrhea virus

<400> 3

Glu Asn Ile Thr Gln Trp Asn Leu Gln Asp Asn Gly Thr Glu Gly Ile
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Gln Arg Ala Met Phe Gln Arg Gly Val Asn Arg Ser Leu His Gly Ile
20 25 30

Trp Pro Glu Lys Ile Cys Thr Gly Val Pro Ser His Leu Ala Thr Asp
35 40 45

Ile Glu Leu Lys Thr Ile His Gly Met Met Asp Ala Ser Glu Lys Thr
50 55 60

Asn Tyr Thr Cys Cys Arg Leu Gln Arg His Glu Trp Asn Lys His Gly
65 70 75 80

Trp Cys Asn Trp Tyr Asn Ile Glu Pro Trp Ile Leu Val Met Asn Arg
85 90 95

Thr Gln Ala Asn Leu Thr Glu Gly Gln Pro Pro Arg Glu Cys Ala Val
 100 105 110

Thr Cys Arg Tyr Asp Arg Ala Ser Asp Leu Asn Val Val Thr Gln Ala
 115 120 125

Arg Asp Ser Pro Thr Pro Leu Thr Gly Cys Lys Lys Gly Lys Asn Phe
 130 135 140

Ser Phe Ala Gly Ile Leu Met Arg Gly Pro Cys Asn Phe Glu Ile Ala
 145 150 155 160

Ala Ser Asp Val Leu Phe Lys Glu His Glu Arg Ile Ser Met Phe Gln
 165 170 175

Asp Thr Thr Leu Tyr Leu Val Asp Gly Leu Thr Asn Ser Leu Glu Gly
 180 185 190

Ala Arg Gln Gly Thr Ala Lys Leu Thr Thr Trp Leu Gly Lys Gln Leu
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Gly Ile Leu Gly Lys Lys Leu Glu Asn Lys Ser Lys Thr Trp Phe Gly
 210 215 220

Ala Tyr Ala
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<210> 4
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 <212> PRT
 <213> Bovine viral diarrhea virus

<400> 4

Ala Ser Pro Tyr Cys Asp Val Asp Arg Lys Ile Gly Tyr Ile Trp Tyr
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Gly Pro Gly Lys Phe Gly Thr Asn Ala Glu Asp Gly Lys Ile Leu His
 35 40 45

Glu Met Gly Gly His Leu Ser Glu Val Leu Leu Leu Ser Leu Val Val
50 55 60

Leu Ser Asp Phe Ala Pro Glu Thr Ala Ser Val Met Tyr Leu Ile Leu
65 70 75 80

His Phe Ser Ile Pro Gln Ser His Val Asp Val Met Asp Cys Asp Lys
85 90 95

Thr Gln Leu Asn Leu Thr Val Glu Leu Thr Thr Ala Glu Val Ile Pro
100 105 110

Gly Ser Val Trp Asn Leu Gly Lys Tyr Val Cys Ile Arg Pro Asn Trp
115 120 125

Trp Pro Tyr Glu Thr Thr Val Val Leu Ala Phe Glu Glu Val Ser Gln
130 135 140

Val Val Lys Leu Val Leu Arg Ala Leu Arg Asp Leu Thr Arg Ile Trp
145 150 155 160

Asn Ala Ala Thr Thr Thr Ala Phe Leu Val Cys Leu Val Lys Ile Val
165 170 175

Arg Gly Gln Met Val Gln Gly Ile Leu Trp Leu Leu Leu Ile Thr Gly
180 185 190

Val Gln Gly
195

<210> 5
<211> 374
<212> PRT
<213> Bovine viral diarrhea virus

<400> 5

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20 25 30

Tyr Ser Pro Gly Met Lys Leu Glu Asp Thr Met Val Ile Ala Trp Cys
35 40 45

Glu Asp Gly Lys Leu Met Tyr Leu Gln Arg Cys Thr Arg Glu Thr Arg
50 55 60

Tyr Leu Ala Ile Leu His Thr Arg Ala Leu Pro Thr Ser Val Val Phe
65 70 75 80

Lys Lys Leu Phe Asp Gly Arg Lys Gln Glu Asp Val Val Glu Met Asn
85 90 95

Asp Asn Phe Glu Phe Gly Leu Cys Pro Cys Asp Ala Lys Pro Ile Val
100 105 110

Arg Gly Lys Phe Asn Thr Thr Leu Leu Asn Gly Pro Ala Phe Gln Met
115 120 125

Val Cys Pro Ile Gly Trp Thr Gly Thr Val Ser Cys Thr Ser Phe Asn
130 135 140

Met Asp Thr Leu Ala Thr Thr Val Val Arg Thr Tyr Arg Arg Ser Lys
145 150 155 160

Pro Phe Pro His Arg Gln Gly Cys Ile Thr Gln Lys Asn Leu Gly Glu
165 170 175

Asp Leu His Asn Cys Ile Leu Gly Gly Asn Trp Thr Cys Val Pro Gly
180 185 190

Asp Gln Leu Leu Tyr Lys Gly Gly Ser Ile Glu Ser Cys Lys Trp Cys
195 200 205

Gly Tyr Gln Phe Lys Glu Ser Glu Gly Leu Pro His Tyr Pro Ile Gly
210 215 220

Lys Cys Lys Leu Glu Asn Glu Thr Gly Tyr Arg Leu Val Asp Ser Thr
225 230 235 240

Ser Cys Asn Arg Glu Gly Val Ala Ile Val Pro Gln Gly Thr Leu Lys
245 250 255

Cys Lys Ile Gly Lys Thr Thr Val Gln Val Ile Ala Met Asp Thr Lys
260 265 270

Leu Gly Pro Met Pro Cys Arg Pro Tyr Glu Ile Ile Ser Ser Glu Gly
275 280 285

Pro Val Glu Lys Thr Ala Cys Thr Phe Asn Tyr Thr Lys Thr Leu Lys
290 295 300

Asn Lys Tyr Phe Glu Pro Arg Asp Ser Tyr Phe Gln Gln Tyr Met Leu
305 310 315 320

Lys Gly Glu Tyr Gln Tyr Trp Phe Asp Leu Glu Val Thr Asp His His
325 330 335

Arg Asp Tyr Phe Ala Glu Ser Ile Leu Val Val Val Val Ala Leu Leu
340 345 350

Gly Gly Arg Tyr Val Leu Trp Leu Leu Val Thr Tyr Met Val Leu Ser
355 360 365

Glu Gln Lys Ala Leu Gly
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<210> 6
<211> 70
<212> PRT
<213> Bovine viral diarrhea virus

<400> 6

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His Asn Asn Ile Glu Val Val Thr Tyr Phe Leu Leu Leu Tyr Leu Leu
20 25 30

Leu Arg Glu Glu Ser Val Lys Lys Trp Val Leu Leu Leu Tyr His Ile
35 40 45

Leu Val Val His Pro Ile Lys Ser Val Ile Val Ile Leu Leu Met Ile
50 55 60

Gly Asp Val Val Lys Ala
65 70

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<211> 12301
 <212> DNA
 <213> Swine fever virus

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Ser Asp Asp Gly Ala Ser	
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Gly Ser Lys Glu Lys Lys Pro Asp Arg Ile Asn Lys Gly Lys Leu Lys	
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ata gcc cca aaa gag cat gag aag gac agc aga act aag cca cct gac	991
Ile Ala Pro Lys Glu His Glu Lys Asp Ser Arg Thr Lys Pro Pro Asp	
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Ala Thr Ile Val Val Glu Gly Val Lys Tyr Gln Val Lys Lys Lys Gly	
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Lys Val Lys Gly Lys Ser Thr Gln Asp Gly Leu Tyr His Asn Lys Asn	
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aaa cca cca gaa tct agg aag aaa tta gaa aaa gcc cta ttg gca tgg	1135
Lys Pro Pro Glu Ser Arg Lys Lys Leu Glu Lys Ala Leu Leu Ala Trp	
75 80 85	
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Ala Val Ile Ala Ile Met Leu Tyr Gln Pro Val Glu Ala Glu Asn Ile	
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Thr Gln Trp Asn Leu Ser Asp Asn Gly Thr Asn Gly Ile Gln His Ala	
105 110 115	
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Met Tyr Leu Arg Gly Val Ser Arg Ser Leu His Gly Ile Trp Pro Glu	
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Lys Glu Ile Gln Gly Met Met Asp Ala Ser Glu Gly Thr Asn Tyr Thr	
155 160 165	
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Cys Cys Lys Leu Gln Arg His Glu Trp Asn Lys His Gly Trp Cys Asn	
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Trp Tyr Asn Ile Asp Pro Trp Ile Gln Leu Met Asn Arg Thr Gln Ala	
185 190 195	
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Asn Leu Ala Glu Gly Pro Pro Ala Lys Glu Cys Ala Val Thr Cys Arg	
200 205 210	

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Gly Thr Val Ile Glu Gly Pro Cys Asn Phe Asn Val Ser Val Glu Asp	
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Ile Leu Tyr Gly Asp His Glu Cys Gly Ser Leu Leu Gln Asp Thr Ala	
265 270 275	
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Leu Tyr Leu Val Asp Gly Met Thr Asn Thr Ile Glu Asn Ala Arg Gln	
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Leu Ser Pro Tyr Cys Asn Val Thr Ser Lys Ile Gly Tyr Ile Trp Tyr	
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Glu Met Gly Gly His Leu Ser Glu Phe Leu Leu Ser Leu Val Val	
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Leu Ser Asp Phe Ala Pro Glu Thr Ala Ser Ala Leu Tyr Leu Ile Leu	
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His Tyr Met Ile Pro Gln Ser His Glu Glu Pro Glu Gly Cys Asp Thr	
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Asn Gln Leu Asn Leu Thr Val Glu Leu Arg Thr Glu Asp Val Ile Pro	
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Asp	Lys	Pro	Phe	Pro	His	Arg	Met	Asp	Cys	Ala	Thr	Thr	Thr	Val	Glu	
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		745					750					755				
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Ser	Thr	Asp	Cys	Asn	Arg	Asp	Gly	Val	Val	Ile	Ser	Thr	Asp	Gly	Ser	
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His	Glu	Cys	Leu	Ile	Gly	Asn	Thr	Thr	Val	Lys	Val	His	Ala	Ser	Asp	
775					780					785					790	
gaa	aga	ctg	ggc	cct	atg	cca	tgc	aga	ccc	aaa	gag	att	gtc	tct	agt	3295
Glu	Arg	Leu	Gly	Pro	Met	Pro	Cys	Arg	Pro	Lys	Glu	Ile	Val	Ser	Ser	
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gca	gga	cct	gta	agg	aaa	act	tcc	tgt	aca	ttc	aac	tac	gca	aaa	act	3343
Ala	Gly	Pro	Val	Arg	Lys	Thr	Ser	Cys	Thr	Phe	Asn	Tyr	Ala	Lys	Thr	
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Leu	Lys	Asn	Lys	Tyr	Tyr	Glu	Pro	Arg	Asp	Ser	Tyr	Phe	Gln	Gln	Tyr	
		825					830					835				
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Tyr Phe Leu Leu Leu Tyr Leu Val Met Arg Asp Glu Pro Ile Lys Lys			
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Trp Ile Leu Leu Leu Phe His Ala Met Thr Asn Asn Pro Val Lys Thr			
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Ile Thr Val Ala Leu Leu Met Val Ser Gly Val Ala Lys Gly			
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 <211> 99
 <212> PRT
 <213> Swine fever virus

<400> 8

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Asn Lys Gly Lys Leu Lys Ile Ala Pro Lys Glu His Glu Lys Asp Ser
 20 25 30

Arg Thr Lys Pro Pro Asp Ala Thr Ile Val Val Glu Gly Val Lys Tyr
 35 40 45

Gln Val Lys Lys Lys Gly Lys Val Lys Gly Lys Ser Thr Gln Asp Gly
 50 55 60

Leu Tyr His Asn Lys Asn Lys Pro Pro Glu Ser Arg Lys Lys Leu Glu
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Lys Ala Leu Leu Ala Trp Ala Val Ile Ala Ile Met Leu Tyr Gln Pro
 85 90 95

Val Glu Ala

<210> 9
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<212> PRT
<213> Swine fever virus

<400> 9

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Gln His Ala Met Tyr Leu Arg Gly Val Ser Arg Ser Leu His Gly Ile
20 25 30

Trp Pro Glu Lys Ile Cys Lys Gly Val Pro Thr Tyr Leu Ala Thr Asp
35 40 45

Thr Glu Leu Lys Glu Ile Gln Gly Met Met Asp Ala Ser Glu Gly Thr
50 55 60

Asn Tyr Thr Cys Cys Lys Leu Gln Arg His Glu Trp Asn Lys His Gly
65 70 75 80

Trp Cys Asn Trp Tyr Asn Ile Asp Pro Trp Ile Gln Leu Met Asn Arg
85 90 95

Thr Gln Ala Asn Leu Ala Glu Gly Pro Pro Ala Lys Glu Cys Ala Val
100 105 110

Thr Cys Arg Tyr Asp Lys Asp Ala Asp Ile Asn Val Val Thr Gln Ala
115 120 125

Arg Asn Arg Pro Thr Thr Leu Thr Gly Cys Lys Lys Gly Lys Asn Phe
130 135 140

Ser Phe Ala Gly Thr Val Ile Glu Gly Pro Cys Asn Phe Asn Val Ser
145 150 155 160

Val Glu Asp Ile Leu Tyr Gly Asp His Glu Cys Gly Ser Leu Leu Gln
165 170 175

Asp Thr Ala Leu Tyr Leu Val Asp Gly Met Thr Asn Thr Ile Glu Asn
180 185 190

Ala Arg Gln Gly Ala Ala Arg Val Thr Ser Trp Leu Gly Arg Gln Leu
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Ser Thr Ala Gly Lys Arg Leu Glu Gly Arg Ser Lys Thr Trp Phe Gly
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Ala Tyr Ala
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<210> 10
 <211> 195
 <212> PRT
 <213> Swine fever virus

<400> 10

Leu Ser Pro Tyr Cys Asn Val Thr Ser Lys Ile Gly Tyr Ile Trp Tyr
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Thr Asn Asn Cys Thr Pro Ala Cys Leu Pro Lys Asn Thr Lys Ile Ile
 20 25 30

Gly Pro Gly Lys Phe Asp Thr Asn Ala Glu Asp Gly Lys Ile Leu His
 35 40 45

Glu Met Gly Gly His Leu Ser Glu Phe Leu Leu Leu Ser Leu Val Val
 50 55 60

Leu Ser Asp Phe Ala Pro Glu Thr Ala Ser Ala Leu Tyr Leu Ile Leu
 65 70 75 80

His Tyr Met Ile Pro Gln Ser His Glu Glu Pro Glu Gly Cys Asp Thr
 85 90 95

Asn Gln Leu Asn Leu Thr Val Glu Leu Arg Thr Glu Asp Val Ile Pro
 100 105 110

Ser Ser Val Trp Asn Val Gly Lys Tyr Val Cys Val Arg Pro Asp Trp
 115 120 125

Trp Pro Tyr Glu Thr Lys Val Ala Leu Leu Phe Glu Glu Ala Gly Gln
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Val Val Lys Leu Ala Leu Arg Ala Leu Arg Asp Leu Thr Arg Val Trp
 145 150 155 160

Asn Ser Ala Ser Thr Thr Ala Phe Leu Ile Cys Leu Ile Lys Val Leu
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Arg Gly Gln Ile Val Gln Gly Val Ile Trp Leu Leu Leu Val Thr Gly
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Ala Gln Gly
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<210> 11
<211> 373
<212> PRT
<213> Swine fever virus

<400> 11

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Glu Ile Gly Leu Leu Gly Ala Glu Gly Leu Thr Thr Thr Trp Lys Glu
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Tyr Asn His Asp Leu Gln Leu Asn Asp Gly Thr Val Lys Ala Ile Cys
35 40 45

Val Ala Gly Ser Phe Lys Val Ile Ala Leu Asn Val Val Ser Arg Arg
50 55 60

Tyr Leu Ala Ser Leu His Lys Glu Ala Ser Leu Thr Ser Val Thr Phe
65 70 75 80

Glu Leu Leu Phe Asp Gly Thr Asn Pro Ser Thr Glu Glu Met Gly Asp
85 90 95

Asp Phe Gly Phe Gly Leu Cys Pro Phe Asp Thr Ser Pro Val Val Lys
100 105 110

Gly Lys Tyr Asn Thr Thr Leu Leu Asn Gly Ser Ala Phe Tyr Leu Val
115 120 125

Cys Pro Ile Gly Trp Thr Gly Val Ile Glu Cys Thr Ala Val Ser Pro
130 135 140

Thr Thr Leu Arg Thr Glu Val Val Lys Thr Phe Arg Arg Asp Lys Pro
145 150 155 160

Phe Pro His Arg Met Asp Cys Ala Thr Thr Thr Val Glu Asn Gly Asp
165 170 175

Leu Phe Tyr Cys Lys Leu Gly Gly Asn Trp Thr Cys Val Lys Gly Glu
180 185 190

Pro Val Val Tyr Thr Gly Gly Leu Val Lys Gln Cys Arg Trp Cys Gly
195 200 205

Phe Asp Phe Asn Glu Pro Asp Gly Leu Pro His Tyr Pro Ile Gly Lys
210 215 220

Cys Ile Leu Val Asn Glu Thr Gly Tyr Arg Ile Val Asp Ser Thr Asp
225 230 235 240

Cys Asn Arg Asp Gly Val Val Ile Ser Thr Asp Gly Ser His Glu Cys
245 250 255

Leu Ile Gly Asn Thr Thr Val Lys Val His Ala Ser Asp Glu Arg Leu
260 265 270

Gly Pro Met Pro Cys Arg Pro Lys Glu Ile Val Ser Ser Ala Gly Pro
275 280 285

Val Arg Lys Thr Ser Cys Thr Phe Asn Tyr Ala Lys Thr Leu Lys Asn
290 295 300

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<210> 14
<211> 100
<212> PRT
<213> Border disease virus

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<400> 14

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20 25 30

Ser Arg Ser Lys Pro Pro Asp Ala Thr Ile Val Val Glu Gly Ile Lys
35 40 45

Tyr Gln Val Lys Lys Lys Gly Lys Val Lys Gly Lys Asn Thr Gln Asp
50 55 60

Gly Leu Tyr His Asn Lys Asn Lys Pro Pro Glu Ser Arg Lys Lys Leu
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Glu Lys Ala Leu Leu Ala Trp Ala Ile Ile Ala Ile Phe Met Trp Glu
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Pro Val Ala Pro
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<210> 15
<211> 227
<212> PRT
<213> Border disease virus

<400> 15

Glu Asn Val Thr Gln Trp Asn Leu Ser Asp Asn Gly Thr Thr Gly Ile
1 5 10 15

Gln Leu Leu Met Phe Gln Arg Gly Val Asn Arg Ser Leu His Gly Ile
20 25 30

Trp Pro Glu Lys Ile Cys Thr Gly Val Pro Thr His Leu Ala Thr Asp
35 40 45

Ala Glu Leu Lys Gly Ile Gln Gly Met Met Asp Ala Ser Glu Lys Thr
50 55 60

Asn Tyr Thr Cys Cys Arg Leu Gln Arg His Glu Trp Asn Lys Tyr Gly
65 70 75 80

Trp Cys Asn Trp Tyr Asn Ile Asn Pro Trp Ile Trp Leu Met Asn Lys
85 90 95

Thr Gln Ala Asn Leu Thr Glu Gly Pro Pro Glu Lys Glu Cys Ala Val

100	105	110
Thr Cys Arg Phe Asp Lys Glu Ala Asp Ile Asn Ile Val Thr Gln Ala		
115	120	125
Arg Asp Arg Pro Thr Thr Leu Thr Gly Cys Lys Lys Gly Lys Lys Phe		
130	135	140
Ser Phe Ala Gly Met Ile Ile Glu Gly Pro Cys Asn Phe Asn Val Ser		
145	150	155
Val Glu Asp Ile Leu Phe Gly Asp Asn Glu Cys Ser Ser Leu Phe Gln		
165	170	175
Asp Thr Ala Leu Tyr Val Val Asp Gly Val Thr Asn Thr Val Glu Asn		
180	185	190
Ala Arg Gln Gly Ala Ala Lys Leu Thr Ser Trp Leu Gly Lys Gln Leu		
195	200	205
Gly Ile Met Gly Lys Lys Leu Glu His Lys Ser Lys Thr Trp Phe Gly		
210	215	220
Ala Asn Ala		
225		

<210> 16
 <211> 195
 <212> PRT
 <213> Border disease virus

<400> 16

Gln Ser Pro Tyr Cys Asn Val Thr Arg Lys Ile Gly Tyr Val Trp Tyr
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Thr Asn Asn Cys Thr Pro Ala Cys Leu Pro Lys Asn Thr Lys Ile Ile
20 25 30
Gly Pro Gly Lys Phe Asp Thr Asn Ala Glu Asp Gly Lys Ile Leu His
35 40 45
Glu Met Arg Gly His Ile Ser Glu Phe Ile Leu Leu Ser Leu Val Val
50 55 60

Leu Ser Asp Phe Ala Pro Glu Thr Ala Ser Thr Leu Tyr Leu Val Leu
65 70 75 80

His Phe Ala Leu Pro Gln Thr His Glu Val Pro Ser Val Cys Asp Thr
85 90 95

Asn Gln Leu Asn Leu Thr Val Ser Leu Arg Val Asp Asp Val Ile Pro
100 105 110

Ser Ser Val Trp Asn Leu Gly Lys Tyr Val Cys Val Arg Pro Asp Trp
115 120 125

Trp Pro Tyr Glu Thr Thr Met Val Leu Leu Phe Glu Glu Ala Gly Gln
130 135 140

Val Val Lys Leu Val Leu Arg Ala Ile Arg Asp Leu Thr Arg Val Trp
145 150 155 160

Asn Ser Ala Ser Thr Thr Ala Phe Leu Ile Cys Leu Val Lys Val Leu
165 170 175

Arg Gly Gln Val Val Gln Gly Leu Val Trp Leu Leu Leu Val Thr Gly
180 185 190

Ala Gln Gly
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<210> 17
<211> 373
<212> PRT
<213> Border disease virus

<400> 17

Gln Phe Ala Cys Arg Glu Asp Tyr Arg Tyr Ala Leu Ala Arg Thr Lys
1 5 10 15

Glu Ile Gly Ala Leu Gly Ala Glu Ser Leu Thr Thr Thr Trp Thr Asp
20 25 30

Tyr Arg Gly Asn Leu Glu Leu Asp Asp Gly Thr Val Arg Ala Thr Cys
35 40 45

Ser Arg Gly Phe Phe Arg Phe Arg Gly His Cys Met Ile Gly Pro Arg

50		55		60											
Tyr 65	Leu	Ala	Ser	Leu	His 70	Leu	Arg	Ala	Leu	Pro 75	Thr	Ser	Val	Thr	Phe 80
Glu	Leu	Ile	Pro	Gly 85	Gly	Ser	Ala	Met	Thr 90	Glu	Glu	Glu	Met	Gly 95	Asp
Asp	Phe	Glu	Phe	Gly 100	Leu	Cys	Pro	Cys 105	Asp	Ser	Arg	Pro	Val 110	Val	Lys
Gly	Lys	Tyr 115	Asn	Thr	Thr	Leu	Leu	Asn 120	Gly	Ser	Ala	Phe	Gln 125	Leu	Ile
Cys	Pro 130	Tyr	Gly	Trp	Val	Gly 135	Arg	Val	Glu	Cys	Thr 140	Thr	Val	Ser	Lys
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Phe	Pro	Gln	Arg	Val 165	Gly	Cys	Asp	His	Thr 170	Thr	Val	Tyr	Lys	Gln 175	Asp
Leu	Tyr	His	Cys	Gln 180	Met	Gly	Gly	Asn 185	Trp	Thr	Cys	Met	Arg 190	Gly	Glu
Val	Val	Lys 195	Tyr	Val	Gly	Gly	Pro 200	Val	Lys	Lys	Cys	Glu 205	Trp	Cys	Gly
Tyr 210	Val	Phe	Lys	Lys	Arg	Glu 215	Gly	Leu	Pro	His	Tyr 220	Pro	Ile	Gly	Arg
Cys 225	Met	Leu	Arg	Asn	Glu 230	Thr	Gly	Tyr	Arg	Ser	Val 235	Asp	Asp	Thr	Pro 240
Cys	Asp	Arg	Gly	Gly 245	Val	Val	Ile	Ser	Lys 250	Thr	Gly	Glu	Leu	Glu 255	Cys
Leu	Ile	Gly	Lys	Thr 260	Thr	Val	Lys	Val 265	Phe	Ser	Ser	Asp	Lys 270	Lys	Leu
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Val Ser Lys Ile Ala Cys Thr Phe Asn Tyr Ser Lys Thr Leu Glu Asn
290 295 300

Lys Tyr Tyr Glu Pro Arg Asp Ser Tyr Phe Gln Gln Tyr Met Leu Lys
305 310 315 320

Gly Gln Tyr Gln Tyr Trp Phe Asp Leu Glu Ala Thr Asp His His Ser
325 330 335

Asp Tyr Phe Ala Glu Phe Ile Met Leu Ala Val Val Ala Leu Leu Gly
340 345 350

Gly Arg Tyr Val Leu Trp Leu Met Val Val Tyr Met Ile Leu Ala Asp
355 360 365

Gln Met Thr Ser Ala
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<210> 18
<211> 70
<212> PRT
<213> Border disease virus

<400> 18

Ile Asn Leu Gly Gln Gly Glu Val Val Leu Ile Gly Asn Leu Ile Thr
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His Glu Asp His Glu Val Val Val Tyr Phe Leu Leu Leu Tyr Leu Ile
20 25 30

Val Lys Asp Glu Pro Val Lys Lys Trp Ile Leu Phe Leu Phe His Ala
35 40 45

Met Thr Asn Asn Pro Val Lys Thr Ile Ser Val Gly Leu Leu Met Leu
50 55 60

Ser Gly Leu Val Lys Gly
65 70

<210> 19
<211> 2694
<212> DNA
<213> Bovine viral diarrhea virus : deltaCErnsE1E2p7

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<210> 20
<211> 900
<212> PRT
<213> Bovine viral diarrhea virus : deltaCErnsE1E2p7

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<223> core protein

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<222> (35)..(261)
<223> Erns

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<220>
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<222> (262)..(456)
<223> E1

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<220>
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<223> p7

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Met Gly Glu Asn Ile Thr Gln Trp Asn Leu Gln Asp Asn Gly Thr Glu
35 40 45

Gly Ile Gln Arg Ala Met Phe Gln Arg Gly Val Asn Arg Ser Leu His
50 55 60

Gly Ile Trp Pro Glu Lys Ile Cys Thr Gly Val Pro Ser His Leu Ala
65 70 75 80

Thr Asp Ile Glu Leu Lys Thr Ile His Gly Met Met Asp Ala Ser Glu
85 90 95

Lys Thr Asn Tyr Thr Cys Cys Arg Leu Gln Arg His Glu Trp Asn Lys
100 105 110

His Gly Trp Cys Asn Trp Tyr Asn Ile Glu Pro Trp Ile Leu Val Met
115 120 125

Asn Arg Thr Gln Ala Asn Leu Thr Glu Gly Gln Pro Pro Arg Glu Cys
130 135 140

Ala Val Thr Cys Arg Tyr Asp Arg Ala Ser Asp Leu Asn Val Val Thr
145 150 155 160

Gln Ala Arg Asp Ser Pro Thr Pro Leu Thr Gly Cys Lys Lys Gly Lys
165 170 175

Asn Phe Ser Phe Ala Gly Ile Leu Met Arg Gly Pro Cys Asn Phe Glu
180 185 190

Ile Ala Ala Ser Asp Val Leu Phe Lys Glu His Glu Arg Ile Ser Met
195 200 205

Phe Gln Asp Thr Thr Leu Tyr Leu Val Asp Gly Leu Thr Asn Ser Leu
210 215 220

Glu Gly Ala Arg Gln Gly Thr Ala Lys Leu Thr Thr Trp Leu Gly Lys
225 230 235 240

Gln Leu Gly Ile Leu Gly Lys Lys Leu Glu Asn Lys Ser Lys Thr Trp
245 250 255

Phe Gly Ala Tyr Ala Ala Ser Pro Tyr Cys Asp Val Asp Arg Lys Ile
260 265 270

Gly Tyr Ile Trp Tyr Thr Lys Asn Cys Thr Pro Ala Cys Leu Pro Lys
275 280 285

Asn Thr Lys Ile Val Gly Pro Gly Lys Phe Gly Thr Asn Ala Glu Asp
290 295 300

Gly Lys Ile Leu His Glu Met Gly Gly His Leu Ser Glu Val Leu Leu
305 310 315 320

Leu Ser Leu Val Val Leu Ser Asp Phe Ala Pro Glu Thr Ala Ser Val
325 330 335

Met Tyr Leu Ile Leu His Phe Ser Ile Pro Gln Ser His Val Asp Val
340 345 350

Met Asp Cys Asp Lys Thr Gln Leu Asn Leu Thr Val Glu Leu Thr Thr
355 360 365

Ala Glu Val Ile Pro Gly Ser Val Trp Asn Leu Gly Lys Tyr Val Cys
370 375 380

Ile Arg Pro Asn Trp Trp Pro Tyr Glu Thr Thr Val Val Leu Ala Phe

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Glu Glu Val Ser	Gln Val Val Lys Leu Val	Leu Arg Ala Leu Arg Asp				
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Leu Thr Arg Ile	Trp Asn Ala Ala Thr Thr	Ala Phe Leu Val Cys				
	420	425		430		
Leu Val Lys Ile	Val Arg Gly Gln Met Val	Gln Gly Ile Leu Trp Leu				
	435	440		445		
Leu Leu Ile Thr	Gly Val Gln Gly His Leu Asp	Cys Lys Pro Glu Phe				
	450	455		460		
Ser Tyr Ala Ile	Ala Lys Asp Glu Arg Ile	Gly Gln Leu Gly Ala Glu				
465	470	475		480		
Gly Leu Thr Thr	Thr Trp Lys Glu Tyr Ser	Pro Gly Met Lys Leu Glu				
	485	490		495		
Asp Thr Met Val	Ile Ala Trp Cys Glu Asp	Gly Lys Leu Met Tyr Leu				
	500	505		510		
Gln Arg Cys Thr	Arg Glu Thr Arg Tyr Leu	Ala Ile Leu His Thr Arg				
	515	520		525		
Ala Leu Pro Thr	Ser Val Val Phe Lys Lys	Leu Phe Asp Gly Arg Lys				
	530	535		540		
Gln Glu Asp Val	Val Glu Met Asn Asp Asn	Phe Glu Phe Gly Leu Cys				
545	550	555		560		
Pro Cys Asp Ala	Lys Pro Ile Val Arg Gly	Lys Phe Asn Thr Thr Leu				
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Leu Asn Gly Pro	Ala Phe Gln Met Val Cys	Pro Ile Gly Trp Thr Gly				
	580	585		590		
Thr Val Ser Cys	Thr Ser Phe Asn Met Asp	Thr Leu Ala Thr Thr Val				
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Val Arg Thr Tyr	Arg Arg Ser Lys Pro Phe	Pro His Arg Gln Gly Cys				
610	615	620				

Ile Thr Gln Lys Asn Leu Gly Glu Asp Leu His Asn Cys Ile Leu Gly
625 630 635 640

Gly Asn Trp Thr Cys Val Pro Gly Asp Gln Leu Leu Tyr Lys Gly Gly
645 650 655

Ser Ile Glu Ser Cys Lys Trp Cys Gly Tyr Gln Phe Lys Glu Ser Glu
660 665 670

Gly Leu Pro His Tyr Pro Ile Gly Lys Cys Lys Leu Glu Asn Glu Thr
675 680 685

Gly Tyr Arg Leu Val Asp Ser Thr Ser Cys Asn Arg Glu Gly Val Ala
690 695 700

Ile Val Pro Gln Gly Thr Leu Lys Cys Lys Ile Gly Lys Thr Thr Val
705 710 715 720

Gln Val Ile Ala Met Asp Thr Lys Leu Gly Pro Met Pro Cys Arg Pro
725 730 735

Tyr Glu Ile Ile Ser Ser Glu Gly Pro Val Glu Lys Thr Ala Cys Thr
740 745 750

Phe Asn Tyr Thr Lys Thr Leu Lys Asn Lys Tyr Phe Glu Pro Arg Asp
755 760 765

Ser Tyr Phe Gln Gln Tyr Met Leu Lys Gly Glu Tyr Gln Tyr Trp Phe
770 775 780

Asp Leu Glu Val Thr Asp His His Arg Asp Tyr Phe Ala Glu Ser Ile
785 790 795 800

Leu Val Val Val Val Ala Leu Leu Gly Gly Arg Tyr Val Leu Trp Leu
805 810 815

Leu Val Thr Tyr Met Val Leu Ser Glu Gln Lys Ala Leu Gly Ile Gln
820 825 830

Tyr Gly Ser Gly Glu Val Val Met Met Gly Asn Leu Leu Thr His Asn
835 840 845

Asn Ile Glu Val Val Thr Tyr Phe Leu Leu Leu Tyr Leu Leu Leu Arg
850 855 860

Glu Glu Ser Val Lys Lys Trp Val Leu Leu Leu Tyr His Ile Leu Val
865 870 875 880

Val His Pro Ile Lys Ser Val Ile Val Ile Leu Leu Met Ile Gly Asp
885 890 895

Val Val Lys Ala
900

<210> 21
<211> 2484
<212> DNA
<213> Bovine viral diarrhea virus : delraCErnsE1E2

<400> 21
aaaaacaaac ctcaggaatc acgcaagaaa ctggaaaaag cattgttggc gtgggcaata 60
atagctatag ttttgtttca agttacaatg ggagaaaaca taacacagtg gaacctacaa 120
gataatggga cggaagggat acaacgggca atgttccaaa ggggtgtgaa tagaagtta 180
catggaatct ggccagagaa aatctgtact ggcgtccctt cccatctagc caccgatata 240
gaactaaaaa caattcatgg tatgatggat gcaagtgaga agaccaacta cacgtgttgc 300
agacttcaac gccatgagtg gaacaagcat ggttggtgca actggtacaa tattgaaccc 360
tggattctag tcatgaatag aacccaagcc aatctcactg agggacaacc accaaggagg 420
tgcgcagtc aattgtaggta tgatagggt agtgacttaa acgtggtaac acaagctaga 480
gatagcccca cacccttaac aggttgcaag aaaggaaaga acttctcctt tgcaggcata 540
ttgatgcggg gccctgcaa ctttgaaata gctgcaagtg atgtattatt caaagaacat 600
gaacgcatta gtatgttcca ggataccact ctttaccttg ttgacgggtt gaccaactcc 660
ttagaagggt ccagacaagg aacogctaaa ctgacaacct ggtaggcaa gcagctcggg 720
atactaggaa aaaagttgga aaacaagagt aagacgtggt ttggagcata cgctgcttcc 780
ccttactgtg atgtcgatcg caaaattggc tacatatggt atacaaaaaa ttgcaccctt 840
gcctgcttac ccaagaacac aaaaattgtc ggccctggga aatttggcac caatgcagag 900
gacggcaaga tattacatga gatggggggg cacttgctcg aggtactact actttcttta 960
gtggtgctgt ccgacttcgc accggaaaca gctagtgtaa tgtacctaact cctacatttt 1020

tccatccac aaagtcacgt tgatgtaatg gattgtgata agaccagtt gaacctcaca	1080
gtggagctga caacagctga agtaatacca gggtcggtct ggaatctagg caaatatgta	1140
tgtataagac caaattggtg gccttatgag acaactgtag tgttggcatt tgaagaggtg	1200
agccaggtgg tgaagttagt gttgagggca ctgagagatt taacacgcat ttggaacgct	1260
gcaacaacta ctgctttttt agtatgcctt gttaagatag tcaggggcca gatggtacag	1320
ggcattctgt ggctactatt gataacaggg gtacaagggc acttggattg caaacctgaa	1380
ttctcgtatg ccatagcaaa ggacgaaaga attgggtcaac tgggggctga aggccttacc	1440
accacttggg aggaatactc acctggaatg aagctggaag acacaatggg cattgcttgg	1500
tgccaagatg ggaagttaat gtacctcaa agatgcacga gagaaaccag atatctcgca	1560
atcttgcata caagagcctt gccgaccagt gtggtattca aaaaactctt tgatgggcga	1620
aagcaagagg atgtagtcga aatgaacgac aactttgaat ttggactctg cccatgtgat	1680
gccaaacca tagtaagagg gaagttcaat acaacgctgc tgaacggacc ggccttccag	1740
atggtatgcc ccataggatg gacagggact gtaagctgta cgtcattcaa tatggacacc	1800
ttagcccaa ctgtggtacg gacatataga aggtctaaac cattccctca taggcaaggc	1860
tgtatcacc aaagaatct gggggaggat ctccataact gcaccttgg aggaaattgg	1920
acttgtgtgc ctggagacca actactatac aaagggggct ctattgaatc ttgcaagtgg	1980
tgtggctatc aatttaaaga gagtgagga ctaccacact accccattgg caagtgtaaa	2040
ttggagaacg agactggtta caggctagta gacagtacct cttgcaatag agaaggtgtg	2100
gccatagtac cacaagggaac attaaagtgc aagataggaa aaacaactgt acaggtcata	2160
gctatggata ccaaactcgg acctatgcct tgcagaccat atgaaatcat atcaagtgag	2220
gggcctgtag aaaagacagc gtgtactttc aactacacta agacattaaa aaataagtar	2280
tttgagccca gagacagcta ctttcagcaa tacatgctaa aaggagagta tcaatactgg	2340
tttgacctgg aggtgactga ccatcaccgg gattacttcg ctgagtcctat attagtgggtg	2400
gtagtagccc tcttgggtgg cagatatgta ctttgggttac tggttacata catggtctta	2460
tcagaacaga aggccttagg gtga	2484

<210> 22
 <211> 827
 <212> PRT
 <213> Bovine viral diarrhea virus : deltaCErnsE1E2
 <400> 22

Lys Asn Lys Pro Gln Glu Ser Arg Lys Lys Leu Glu Lys Ala Leu Leu
1 5 10 15

Ala Trp Ala Ile Ile Ala Ile Val Leu Phe Gln Val Thr Met Gly Glu
20 25 30

Asn Ile Thr Gln Trp Asn Leu Gln Asp Asn Gly Thr Glu Gly Ile Gln
35 40 45

Arg Ala Met Phe Gln Arg Gly Val Asn Arg Ser Leu His Gly Ile Trp
50 55 60

Pro Glu Lys Ile Cys Thr Gly Val Pro Ser His Leu Ala Thr Asp Ile
65 70 75 80

Glu Leu Lys Thr Ile His Gly Met Met Asp Ala Ser Glu Lys Thr Asn
85 90 95

Tyr Thr Cys Cys Arg Leu Gln Arg His Glu Trp Asn Lys His Gly Trp
100 105 110

Cys Asn Trp Tyr Asn Ile Glu Pro Trp Ile Leu Val Met Asn Arg Thr
115 120 125

Gln Ala Asn Leu Thr Glu Gly Gln Pro Pro Arg Glu Cys Ala Val Thr
130 135 140

Cys Arg Tyr Asp Arg Ala Ser Asp Leu Asn Val Val Thr Gln Ala Arg
145 150 155 160

Asp Ser Pro Thr Pro Leu Thr Gly Cys Lys Lys Gly Lys Asn Phe Ser
165 170 175

Phe Ala Gly Ile Leu Met Arg Gly Pro Cys Asn Phe Glu Ile Ala Ala
180 185 190

Ser Asp Val Leu Phe Lys Glu His Glu Arg Ile Ser Met Phe Gln Asp
195 200 205

Thr Thr Leu Tyr Leu Val Asp Gly Leu Thr Asn Ser Leu Glu Gly Ala
210 215 220

Arg Gln Gly Thr Ala Lys Leu Thr Thr Trp Leu Gly Lys Gln Leu Gly
225 230 235 240

Ile Leu Gly Lys Lys Leu Glu Asn Lys Ser Lys Thr Trp Phe Gly Ala
245 250 255

Tyr Ala Ala Ser Pro Tyr Cys Asp Val Asp Arg Lys Ile Gly Tyr Ile
260 265 270

Trp Tyr Thr Lys Asn Cys Thr Pro Ala Cys Leu Pro Lys Asn Thr Lys
275 280 285

Ile Val Gly Pro Gly Lys Phe Gly Thr Asn Ala Glu Asp Gly Lys Ile
290 295 300

Leu His Glu Met Gly Gly His Leu Ser Glu Val Leu Leu Leu Ser Leu
305 310 315 320

Val Val Leu Ser Asp Phe Ala Pro Glu Thr Ala Ser Val Met Tyr Leu
325 330 335

Ile Leu His Phe Ser Ile Pro Gln Ser His Val Asp Val Met Asp Cys
340 345 350

Asp Lys Thr Gln Leu Asn Leu Thr Val Glu Leu Thr Thr Ala Glu Val
355 360 365

Ile Pro Gly Ser Val Trp Asn Leu Gly Lys Tyr Val Cys Ile Arg Pro
370 375 380

Asn Trp Trp Pro Tyr Glu Thr Thr Val Val Leu Ala Phe Glu Glu Val
385 390 395 400

Ser Gln Val Val Lys Leu Val Leu Arg Ala Leu Arg Asp Leu Thr Arg
405 410 415

Ile Trp Asn Ala Ala Thr Thr Thr Ala Phe Leu Val Cys Leu Val Lys
420 425 430

Ile Val Arg Gly Gln Met Val Gln Gly Ile Leu Trp Leu Leu Leu Ile
435 440 445

Thr Gly Val Gln Gly His Leu Asp Cys Lys Pro Glu Phe Ser Tyr Ala

450		455		460
Ile Ala Lys Asp Glu Arg Ile Gly Gln Leu Gly Ala Glu Gly Leu Thr				
465		470		475
				480
Thr Thr Trp Lys Glu Tyr Ser Pro Gly Met Lys Leu Glu Asp Thr Met				
	485		490	495
Val Ile Ala Trp Cys Glu Asp Gly Lys Leu Met Tyr Leu Gln Arg Cys				
	500		505	510
Thr Arg Glu Thr Arg Tyr Leu Ala Ile Leu His Thr Arg Ala Leu Pro				
	515		520	525
Thr Ser Val Val Phe Lys Lys Leu Phe Asp Gly Arg Lys Gln Glu Asp				
	530		535	540
Val Val Glu Met Asn Asp Asn Phe Glu Phe Gly Leu Cys Pro Cys Asp				
	545		555	560
Ala Lys Pro Ile Val Arg Gly Lys Phe Asn Thr Thr Leu Leu Asn Gly				
	565		570	575
Pro Ala Phe Gln Met Val Cys Pro Ile Gly Trp Thr Gly Thr Val Ser				
	580		585	590
Cys Thr Ser Phe Asn Met Asp Thr Leu Ala Thr Thr Val Val Arg Thr				
	595		600	605
Tyr Arg Arg Ser Lys Pro Phe Pro His Arg Gln Gly Cys Ile Thr Gln				
	610		615	620
Lys Asn Leu Gly Glu Asp Leu His Asn Cys Ile Leu Gly Gly Asn Trp				
	625		630	635
Thr Cys Val Pro Gly Asp Gln Leu Leu Tyr Lys Gly Gly Ser Ile Glu				
	645		650	655
Ser Cys Lys Trp Cys Gly Tyr Gln Phe Lys Glu Ser Glu Gly Leu Pro				
	660		665	670
His Tyr Pro Ile Gly Lys Cys Lys Leu Glu Asn Glu Thr Gly Tyr Arg				
	675		680	685

Leu Val Asp Ser Thr Ser Cys Asn Arg Glu Gly Val Ala Ile Val Pro
690 695 700

Gln Gly Thr Leu Lys Cys Lys Ile Gly Lys Thr Thr Val Gln Val Ile
705 710 715 720

Ala Met Asp Thr Lys Leu Gly Pro Met Pro Cys Arg Pro Tyr Glu Ile
725 730 735

Ile Ser Ser Glu Gly Pro Val Glu Lys Thr Ala Cys Thr Phe Asn Tyr
740 745 750

Thr Lys Thr Leu Lys Asn Lys Tyr Phe Glu Pro Arg Asp Ser Tyr Phe
755 760 765

Gln Gln Tyr Met Leu Lys Gly Glu Tyr Gln Tyr Trp Phe Asp Leu Glu
770 775 780

Val Thr Asp His His Arg Asp Tyr Phe Ala Glu Ser Ile Leu Val Val
785 790 795 800

Val Val Ala Leu Leu Gly Gly Arg Tyr Val Leu Trp Leu Leu Val Thr
805 810 815

Tyr Met Val Leu Ser Glu Gln Lys Ala Leu Gly
820 825

<210> 23
<211> 2013
<212> DNA
<213> Bovine viral diarrhea virus : deltaCE1E2p7

<400> 23
aaaaacaaac ctcaggaatc acgcaagaaa ctggaaaaag cattgttggc gtgggcaata 60
atagctatag ttttgtttca agttacaatg ggagcttccc cttactgtga tgtcgatcgc 120
aaaattggct acatatggta tacaaaaaat tgcacccttg cctgcttacc caagaacaca 180
aaaattgtcg gccctgggaa atttggcacc aatgcagagg acggcaagat attacatgag 240
atgggggggtc acttgctgga ggtactacta ctttcttttag tgggtgctgtc cgacttcgca 300
ccggaaacag ctagtgtaat gtacctaatc ctacattttt ccatcccaca aagtcacgtt 360
gatgtaatgg attgtgataa gaccagttg aacctcacag tggagctgac aacagctgaa 420

gtaataccag ggtcggctctg gaatctaggc aaatatgtat gtataagacc aaattggtgg	480
ccttatgaga caactgtagt gttggcattt gaagaggtga gccaggtggt gaagttagtg	540
ttgagggcac tcagagattt aacacgcatt tggaacgctg caacaactac tgctttttta	600
gtatgccttg ttaagatagt caggggccag atggtacagg gcattctgtg gctactattg	660
ataacagggg tacaagggca cttggattgc aaacctgaat tctcgtatgc catagcaaag	720
gacgaaagaa ttggtcaact gggggctgaa ggccttacca ccacttgga ggaatactca	780
cctggaatga agctggaaga cacaatggtc attgcttggg gcgaagatgg gaagttaatg	840
tacctcaaaa gatgcacgag agaaaccaga tatctcgcaa tcttgcatatc aagagccttg	900
ccgaccagtg tggatttcaa aaaactcttt gatgggcgaa agcaagagga tgtagtcgaa	960
atgaacgaca actttgaatt tggactctgc ccatgtgatg ccaaaccat agtaagaggg	1020
aagttcaata caacgctgct gaacggaccg gccttcaga tggtatgcc cataggatgg	1080
acagggactg taagctgtac gtcattcaat atggacacct tagccacaac tgtggtacgg	1140
acatatagaa ggtctaaacc attccctcat aggcaaggct gtatcaccca aaagaatctg	1200
ggggaggatc tccataactg catccttgga ggaaattgga cttgtgtgcc tggagaccaa	1260
ctactataca aagggggctc tattgaatct tgcaagtggg gtggctatca atttaaagag	1320
agtgagggac taccacacta cccattggc aagtgtaaat tggagaacga gactgggttac	1380
aggctagtag acagtacctc ttgcaataga gaaggtgtgg ccatagtacc acaagggaca	1440
ttaaagtgca agataggaaa aacaactgta caggtcatag ctatggatac caaactcgga	1500
cctatgcctt gcagaccata tgaaatcata tcaagtgagg ggctgtaga aaagacagcg	1560
tgtactttca actacactaa gacattaaaa aataagtatt ttgagcccag agacagctac	1620
tttcagcaat acatgctaaa aggagagtat caatactggg ttgacctgga ggtgactgac	1680
catcacggg attacttcgc tgagtccata ttagtggtgg tagtagccct cttgggtggc	1740
agatatgtac tttggttact ggttacatac atggtottat cagaacagaa ggccttaggg	1800
attcagtatg gatcagggga agtgggtgat atgggcaact tgctaacca taacaatatt	1860
gaagtgggta catacttctt gctgctgtac ctactgctga gggaggagag cgtaaagaag	1920
tgggtcttac tcttatacca catcttagtg gtacacccaa tcaaactctgt aattgtgatc	1980
ctactgatga ttggggatgt ggtaaaggcc tga	2013

<211> 670
 <212> PRT
 <213> Bovine viral diarrhea virus : deltaCE1E2p7

<400> 24

Lys Asn Lys Pro Gln Glu Ser Arg Lys Lys Leu Glu Lys Ala Leu Leu
 1 5 10 15

Ala Trp Ala Ile Ile Ala Ile Val Leu Phe Gln Val Thr Met Gly Ala
 20 25 30

Ser Pro Tyr Cys Asp Val Asp Arg Lys Ile Gly Tyr Ile Trp Tyr Thr
 35 40 45

Lys Asn Cys Thr Pro Ala Cys Leu Pro Lys Asn Thr Lys Ile Val Gly
 50 55 60

Pro Gly Lys Phe Gly Thr Asn Ala Glu Asp Gly Lys Ile Leu His Glu
 65 70 75 80

Met Gly Gly His Leu Ser Glu Val Leu Leu Leu Ser Leu Val Val Leu
 85 90 95

Ser Asp Phe Ala Pro Glu Thr Ala Ser Val Met Tyr Leu Ile Leu His
 100 105 110

Phe Ser Ile Pro Gln Ser His Val Asp Val Met Asp Cys Asp Lys Thr
 115 120 125

Gln Leu Asn Leu Thr Val Glu Leu Thr Thr Ala Glu Val Ile Pro Gly
 130 135 140

Ser Val Trp Asn Leu Gly Lys Tyr Val Cys Ile Arg Pro Asn Trp Trp
 145 150 155 160

Pro Tyr Glu Thr Thr Val Val Leu Ala Phe Glu Glu Val Ser Gln Val
 165 170 175

Val Lys Leu Val Leu Arg Ala Leu Arg Asp Leu Thr Arg Ile Trp Asn
 180 185 190

Ala Ala Thr Thr Thr Ala Phe Leu Val Cys Leu Val Lys Ile Val Arg
 195 200 205

Gly Gln Met Val Gln Gly Ile Leu Trp Leu Leu Leu Ile Thr Gly Val
210 215 220

Gln Gly His Leu Asp Cys Lys Pro Glu Phe Ser Tyr Ala Ile Ala Lys
225 230 235 240

Asp Glu Arg Ile Gly Gln Leu Gly Ala Glu Gly Leu Thr Thr Thr Trp
245 250 255

Lys Glu Tyr Ser Pro Gly Met Lys Leu Glu Asp Thr Met Val Ile Ala
260 265 270

Trp Cys Glu Asp Gly Lys Leu Met Tyr Leu Gln Arg Cys Thr Arg Glu
275 280 285

Thr Arg Tyr Leu Ala Ile Leu His Thr Arg Ala Leu Pro Thr Ser Val
290 295 300

Val Phe Lys Lys Leu Phe Asp Gly Arg Lys Gln Glu Asp Val Val Glu
305 310 315 320

Met Asn Asp Asn Phe Glu Phe Gly Leu Cys Pro Cys Asp Ala Lys Pro
325 330 335

Ile Val Arg Gly Lys Phe Asn Thr Thr Leu Leu Asn Gly Pro Ala Phe
340 345 350

Gln Met Val Cys Pro Ile Gly Trp Thr Gly Thr Val Ser Cys Thr Ser
355 360 365

Phe Asn Met Asp Thr Leu Ala Thr Thr Val Val Arg Thr Tyr Arg Arg
370 375 380

Ser Lys Pro Phe Pro His Arg Gln Gly Cys Ile Thr Gln Lys Asn Leu
385 390 395 400

Gly Glu Asp Leu His Asn Cys Ile Leu Gly Gly Asn Trp Thr Cys Val
405 410 415

Pro Gly Asp Gln Leu Leu Tyr Lys Gly Gly Ser Ile Glu Ser Cys Lys
420 425 430

Trp Cys Gly Tyr Gln Phe Lys Glu Ser Glu Gly Leu Pro His Tyr Pro
435 440 445

Ile Gly Lys Cys Lys Leu Glu Asn Glu Thr Gly Tyr Arg Leu Val Asp
450 455 460

Ser Thr Ser Cys Asn Arg Glu Gly Val Ala Ile Val Pro Gln Gly Thr
465 470 475 480

Leu Lys Cys Lys Ile Gly Lys Thr Thr Val Gln Val Ile Ala Met Asp
485 490 495

Thr Lys Leu Gly Pro Met Pro Cys Arg Pro Tyr Glu Ile Ile Ser Ser
500 505 510

Glu Gly Pro Val Glu Lys Thr Ala Cys Thr Phe Asn Tyr Thr Lys Thr
515 520 525

Leu Lys Asn Lys Tyr Phe Glu Pro Arg Asp Ser Tyr Phe Gln Gln Tyr
530 535 540

Met Leu Lys Gly Glu Tyr Gln Tyr Trp Phe Asp Leu Glu Val Thr Asp
545 550 555 560

His His Arg Asp Tyr Phe Ala Glu Ser Ile Leu Val Val Val Val Ala
565 570 575

Leu Leu Gly Gly Arg Tyr Val Leu Trp Leu Leu Val Thr Tyr Met Val
580 585 590

Leu Ser Glu Gln Lys Ala Leu Gly Ile Gln Tyr Gly Ser Gly Glu Val
595 600 605

Val Met Met Gly Asn Leu Leu Thr His Asn Asn Ile Glu Val Val Thr
610 615 620

Tyr Phe Leu Leu Leu Tyr Leu Leu Leu Arg Glu Glu Ser Val Lys Lys
625 630 635 640

Trp Val Leu Leu Leu Tyr His Ile Leu Val Val His Pro Ile Lys Ser
645 650 655

Val Ile Val Ile Leu Leu Met Ile Gly Asp Val Val Lys Ala

660

665

670

<210> 25
 <211> 1803
 <212> DNA
 <213> Bovine viral diarrhea virus : deltaCE1E2

<400> 25
 aaaaacaaac ctcaggaatc acgcaagaaa ctggaaaaag cattgttggc gtgggcaata 60
 atagctatag ttttgtttca agttacaatg ggagcttccc cttactgtga tgtcgatcgc 120
 aaaattggct acatatggta tacaataaat tgcaccctcg cctgcttacc caagaacaca 180
 aaaattgtcg gccctgggaa atttggcacc aatgcagagg acggcaagat attacatgag 240
 atgggggggtc acttgctcga ggtactacta ctttcttttag tgggtgctgtc cgacttcgca 300
 ccggaaacag ctagtgtaat gtacctaatc ctacattttt ccatcccaca aagtcacggt 360
 gatgtaatgg attgtgataa gaccagttg aacctcacag tggagctgac aacagctgaa 420
 gtaataccag ggtcggctcg gaatctaggc aaatatgtat gtataagacc aaattgggtg 480
 ccttatgaga caactgtagt gttggcattt gaagaggtga gccaggtggg gaagttagtg 540
 ttgagggcac tcagagattt aacacgcatt tggaacgctg caacaactac tgctttttta 600
 gtatgccttg ttaagatagt caggggccag atggtagagg gcattctgtg gctactattg 660
 ataacagggg tacaagggca cttggattgc aaacctgaat tctcgtagtc catagcaaag 720
 gacgaaagaa ttggtcaact gggggctgaa ggccttacca ccacttgga ggaatactca 780
 cctggaatga agctggaaga cacaatggctc attgcttggg gcgaagatgg gaagttaatg 840
 tacctccaaa gatgcacgag agaaaccaga tatctcgcaa tcttgcatatc aagagccttg 900
 ccgaccagtg tggatttcaa aaaactcttt gatgggagaa agcaagagga tgtagtcgaa 960
 atgaacgaca actttgaatt tggactctgc ccatgtgatg ccaaaccat agtaagaggg 1020
 aagttcaata caacgctgct gaacggaccg gccttcaga tggtagtccc cataggatgg 1080
 acagggactg taagctgtac gtcattcaat atggacacct tagccacaac tgtggtacgg 1140
 acatatagaa ggtctaaacc attccctcat aggcaaggct gtatcaccca aaagaatctg 1200
 ggggaggatc tccataactg catccttggg ggaatttggg cttgtgtgcc tggagaccaa 1260
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 aggctagtag acagtacctc ttgcaataga gaaggtgtgg ccatagtacc acaagggaca 1440

ttaaagtgcagatagggaaa aacaactgta cagggtcatag ctatggatac caaactcgga 1500
 cctatgcctt gcagaccata tgaaatcata tcaagtgagg ggcctgtaga aaagacagcg 1560
 tgtactttca actacactaa gacattaaaa aataagtatt ttgagcccag agacagctac 1620
 tttcagcaat acatgctaaa aggagagtat caatactggg ttgacctgga ggtgactgac 1680
 catcaccggg attacttcgc tgagtcata ttagtggtgg tagtagccct cttgggtggc 1740
 agatatgtac tttggttact ggttacatac atggtcttat cagaacagaa ggccttaggg 1800
 tga 1803

<210> 26
 <211> 600
 <212> PRT
 <213> Bovine viral diarrhea virus : deltaCE1E2
 <400> 26

Lys Asn Lys Pro Gln Glu Ser Arg Lys Lys Leu Glu Lys Ala Leu Leu
 1 5 10 15

Ala Trp Ala Ile Ile Ala Ile Val Leu Phe Gln Val Thr Met Gly Ala
 20 25 30

Ser Pro Tyr Cys Asp Val Asp Arg Lys Ile Gly Tyr Ile Trp Tyr Thr
 35 40 45

Lys Asn Cys Thr Pro Ala Cys Leu Pro Lys Asn Thr Lys Ile Val Gly
 50 55 60

Pro Gly Lys Phe Gly Thr Asn Ala Glu Asp Gly Lys Ile Leu His Glu
 65 70 75 80

Met Gly Gly His Leu Ser Glu Val Leu Leu Leu Ser Leu Val Val Leu
 85 90 95

Ser Asp Phe Ala Pro Glu Thr Ala Ser Val Met Tyr Leu Ile Leu His
 100 105 110

Phe Ser Ile Pro Gln Ser His Val Asp Val Met Asp Cys Asp Lys Thr
 115 120 125

Gln Leu Asn Leu Thr Val Glu Leu Thr Thr Ala Glu Val Ile Pro Gly
 130 135 140

Ser Val Trp Asn Leu Gly Lys Tyr Val Cys Ile Arg Pro Asn Trp Trp
145 150 155 160

Pro Tyr Glu Thr Thr Val Val Leu Ala Phe Glu Glu Val Ser Gln Val
165 170 175

Val Lys Leu Val Leu Arg Ala Leu Arg Asp Leu Thr Arg Ile Trp Asn
180 185 190

Ala Ala Thr Thr Thr Ala Phe Leu Val Cys Leu Val Lys Ile Val Arg
195 200 205

Gly Gln Met Val Gln Gly Ile Leu Trp Leu Leu Leu Ile Thr Gly Val
210 215 220

Gln Gly His Leu Asp Cys Lys Pro Glu Phe Ser Tyr Ala Ile Ala Lys
225 230 235 240

Asp Glu Arg Ile Gly Gln Leu Gly Ala Glu Gly Leu Thr Thr Thr Trp
245 250 255

Lys Glu Tyr Ser Pro Gly Met Lys Leu Glu Asp Thr Met Val Ile Ala
260 265 270

Trp Cys Glu Asp Gly Lys Leu Met Tyr Leu Gln Arg Cys Thr Arg Glu
275 280 285

Thr Arg Tyr Leu Ala Ile Leu His Thr Arg Ala Leu Pro Thr Ser Val
290 295 300

Val Phe Lys Lys Leu Phe Asp Gly Arg Lys Gln Glu Asp Val Val Glu
305 310 315 320

Met Asn Asp Asn Phe Glu Phe Gly Leu Cys Pro Cys Asp Ala Lys Pro
325 330 335

Ile Val Arg Gly Lys Phe Asn Thr Thr Leu Leu Asn Gly Pro Ala Phe
340 345 350

Gln Met Val Cys Pro Ile Gly Trp Thr Gly Thr Val Ser Cys Thr Ser
355 360 365

Phe Asn Met Asp Thr Leu Ala Thr Thr Val Val Arg Thr Tyr Arg Arg
370 375 380

Ser Lys Pro Phe Pro His Arg Gln Gly Cys Ile Thr Gln Lys Asn Leu
385 390 395 400

Gly Glu Asp Leu His Asn Cys Ile Leu Gly Gly Asn Trp Thr Cys Val
405 410 415

Pro Gly Asp Gln Leu Leu Tyr Lys Gly Gly Ser Ile Glu Ser Cys Lys
420 425 430

Trp Cys Gly Tyr Gln Phe Lys Glu Ser Glu Gly Leu Pro His Tyr Pro
435 440 445

Ile Gly Lys Cys Lys Leu Glu Asn Glu Thr Gly Tyr Arg Leu Val Asp
450 455 460

Ser Thr Ser Cys Asn Arg Glu Gly Val Ala Ile Val Pro Gln Gly Thr
465 470 475 480

Leu Lys Cys Lys Ile Gly Lys Thr Thr Val Gln Val Ile Ala Met Asp
485 490 495

Thr Lys Leu Gly Pro Met Pro Cys Arg Pro Tyr Glu Ile Ile Ser Ser
500 505 510

Glu Gly Pro Val Glu Lys Thr Ala Cys Thr Phe Asn Tyr Thr Lys Thr
515 520 525

Leu Lys Asn Lys Tyr Phe Glu Pro Arg Asp Ser Tyr Phe Gln Gln Tyr
530 535 540

Met Leu Lys Gly Glu Tyr Gln Tyr Trp Phe Asp Leu Glu Val Thr Asp
545 550 555 560

His His Arg Asp Tyr Phe Ala Glu Ser Ile Leu Val Val Val Val Ala
565 570 575

Leu Leu Gly Gly Arg Tyr Val Leu Trp Leu Leu Val Thr Tyr Met Val
580 585 590

Leu Ser Glu Gln Lys Ala Leu Gly

595

600